<u>Amendments to the Claims</u>:

The following claims will replace all prior versions of the claims in this application (in the unlikely event that no claims follow herein, the previously pending claims will remain):

1.   (Currently Amended) An apparatus for merging virtual connections in an LSR (Label Switching Router) system of an MPLS (Multiprotocol Label Switching) network, comprising:

control means for generating control signals to control an ingress connection or an egress connection in accordance with an order of connection establishment/termination from a central controller;

cell receiving means for establishing/terminating a multi point-to-point (VC merging) or a point-to-point (non-VC merging) connection and attaching an ingress channel handle to a header of cell payload received from upstream, based on the control signals from the control means;

header information converting means for receiving data having a payload and the ingress channel handle as a header from the cell receiving means, reading a TSAR channel identifier of the egress connection by using the ingress channel handle as an address of a lookup memory, and performing header conversion based on the control signals from the control means; and

cell transmitting means for: 1) establishing/terminating the multi point-to-point (VC merging) or the point-to-point non-VC merging) connection, 2) receiving data having the TSAR channel identifier of the egress connection and a payload from the header information converting means as a header, and 3) segmenting data having the TSAR channel identifier of the egress connection and payload from the header information converting means as a header into cells having an egress connection label as a header or generating cells having an egress connection label as a header according to the multi point-to-point or the point-to-point connection by using the TSAR channel identifier of the egress connection, thereby transmitting the cells ~~them to~~ downstream.

2.   (Original) The apparatus as recited in claim 1, wherein the header information converting means maps header information for the multi point-to-point (VC merging) connection capable of transmitting data from a number of channels with the same destination or point-to-point (non-VC merging) connection.

3.   (Original) The apparatus as recited in claim 2, wherein the control means manages the ingress or the egress connection by using an ingress connection table and an egress connection table.

4.   (Original) The apparatus as recited in claim 3, wherein the ingress connection table includes information on the ingress connection channel handles, connection parameters, ingress connection labels, RSAR channel identifiers of the ingress connection, TSAR channel identifiers of the ingress connection, egress connection labels, egress channel handles, RSAR channel identifiers of the egress connection and TSAR channel identifiers of the egress connection.

5.   (Original) The apparatus as recited in claim 3, wherein the egress connection table includes information on egress connection channel handles, connection parameters, the number of leaves, egress connection labels, RSAR channel identifiers of the egress connection and TSAR channel identifiers of the egress connection.

6.   (Original) The apparatus as recited in claim 3, wherein the cell receiving means includes:

first storage means for storing the ingress channel handles and the connection parameters according to the kind of connection while establishing connection based on the control signals from the control means; and

frame assembling means for assembling frames after receiving ATM cells from the upstream and the ingress channel handles and the connection parameters from the first storage means by using labels, VPI/VCI, as an address.

7.   (Currently Amended) The apparatus as recited in claim 6, wherein the connection parameters include the distinction between multi point-to-point (VC merging) and point-to-point (non-VC merging) connections, and <u>between differing types of</u> the kinds of AAL5 (ATM Adaptation Layer 5) frames.

8.   (Original) The apparatus as recited in claim 7, wherein the frame assembling means retrieves AAL5 frames according to the kind of the AAL5 frames, attaches the ingress channel handle to the header of the AAL5 payload and transmits it while receiving MPLS

cells, and wherein the frame assembling means attaches an ingress channel handle to the header of the ATM cell payloads without retrieving AAL5 cells and transmit it to the header information converting means while receiving ATM cells.

9.   (Original) The apparatus as recited in claim 6, wherein the header information converting means receives data from the cell receiving means regardless of the kind of connections, the multi point-to-point or the point-to-point connection, reads a TSAR channel identifier of the egress connection from the lookup memory by using the ingress channel handle as an address, and transmits the data having the TSAR channel identifier of the egress connection and the payload from the cell receiving means as a header to the cell transmission means.

10.   (Original) The apparatus as recited in claim 9, wherein the cell transmitting means includes:
second storage means for storing the egress connection labels and the connection parameters for each TSAR channel identifier while establishing a connection based on the control signals from the control means; and
frame segmentation means for receiving data having a TSAR channel identifier of the egress connection as a header from the header information converting means, and the egress connection label and the connection parameters transmitted from the second storage means using the TSAR channel identifier of the egress connection as an address, thereby segmenting the frames.

11.   (Original) The apparatus as recited in claim 10, wherein in case of the multi point-to-point (VC merging) connection is received, the frame segmentation means generates AAL5 frames by using the payload transmitted from the header information converting means, and segments the generated frames into ATM cells having a first egress connection label as a header, thereby transmitting the ATM cells having the first egress connection label to downstream, and in case of the point-to-point (non-VC merging) connection, the first segmentation means generates ATM cells having a second egress connection label as a header without converting the payload, thereby transmitting ATM cells having the second egress connection label to downstream.

12.   (Cancelled)

13. (Currently Amended) <u>A connection establishing method of a VC merging apparatus in an LSR (Label Switching Router) system in an MPLS (Multiprotocol Label Switching) network, the method comprising the steps of:</u>

<u>a) determining a kind of connection with reference to connection parameters when the connection is requested to be established by a central controller;</u>

<u>b) if the kind of connection is a VC merging connection, establishing a multi point-to-point connection based on an ingress and an egress connection labels; and</u>

<u>c) establishing a point-to-point connection based on the ingress and the egress connection labels if the kind of connections is a non-VC merging connection,</u>

~~The connection establishing method as recited in claim 12,~~ wherein the multi point-to-point connection includes:

a first route connection in which the ingress connection label is different from the egress connection label;

a second route connection in which the ingress connection label is equal to the egress connection label;

a first leaf connection in which the ingress connection label is different from the egress connection label; and

a second leaf connection in which the ingress connection label is equal to the egress connection label.

14. (Original) The connection establishing method as recited in claim 13, wherein the step b) of establishing multi point-to-point connection includes steps of:

b1) determining whether a VCC (Virtual Channel Connection) requested to be established is established as a first connection of the multi point-to-point connection;

b2) checking whether the ingress connection label is equal to the egress connection label;

b3) establishing connections in both a RSAR and a TSAR by using the ingress connection label;

b4) registering parameters on the ingress connection on an ingress connection table;

b5) establishing connections in both the RSAR and the TSAR by using the egress connection label;

b6) registering parameters on the egress connection on an egress connection table;

b7) gradually increasing a number of leaves on the ingress connection table when the leaf is added;

b8) gradually increasing a number of leaves for the egress connection of the egress connection table when the leaf is added; and

b9) registering a TSAR channel identifier of the egress connection to the lookup memory by using an ingress channel handle as an address.

15. (Original) The connection establishing method as recited in claim 14, wherein the point-to-point connection includes:

a first route connection in which the ingress connection label is different from the egress connection label; and

a second route connection in which the ingress connection label is equal to the egress connection label.

16. (Original) The connection establishing method as recited in claim 15, the step c) of establishing the point-to-point connection includes the steps of:

c1) checking whether the ingress connection label is equal to the egress connection label;

c2) establishing connections in both the RSAR and the TSAR by using the ingress connection label;

c3) registering parameters on the ingress connection on an ingress connection table;

c4) establishing connections in both the RSAR and the TSAR by using the egress connection label;

c5) registering parameters on the egress connection on an egress connection table; and

c6) registering a TSAR channel identifier of the egress connection to the lookup memory by using the ingress channel handle as an address.

17. (Currently Amended) The connection establishing method as recited in claim 16, wherein the ingress connection table includes information on the ingress channel handles, connection parameters, the ingress connection labels, RSAR channel identifiers of the ingress connection, TSAR channel identifiers of the ingress connection, egress connection labels, egress channel handles, RSAR channel identifiers of the egress connection and TSAR channel identifiers of the egress connection.

18.   (Original) The connection establishing method as recited in claim 16, wherein the egress connection table includes information on the egress channel handles, connection parameters, the number of leaves, egress connection labels, RSAR channel identifiers of the egress connection, TSAR channel identifiers of the egress connection.

19.   (Cancelled)

20.   (Currently Amended) A connection terminating method of a VC merging apparatus in an LSR (Label Switching Router) system of an MPLS (Multi protocol Label Switching), the method comprising the steps of:
        a) determining a kind of a connection with reference to connection parameters according to an order of connection termination from a central controller;
        b) terminating a multi point-to-point connection based on ingress/egress connection labels, if the kind of the connection is a VC merging connection; and
        c) terminating a point-to-point connection based on ingress/egress connection labels, if the kind of the connection is a non-VC merging connection,
        The connection terminating method as recited in claim 19, wherein the multi point-to-point connection includes:
                a first route connection in which the ingress connection label is different from the egress connection label;
                a second route connection in which the ingress connection label is equal to the egress connection label;
                a first leaf connection in which the ingress connection label is different from the egress connection label; and
                a second leaf connection in which the ingress connection label is equal to the egress connection label.

21.   (Original) The connection terminating method as recited in claim 20, wherein the step b) of terminating the multi point-to-point connection includes the steps of:
        b1) determining whether a VCC (Virtual Channel Connection) requested to be established is terminated as the last connection of a multi point-to-point connection;
        b2) checking if the ingress connection label is equal to the egress connection label;

b3) terminating a connection by providing an RSAR channel identifier of the ingress connection corresponding to the ingress connection to the RSAR, and terminating the connection by providing a TSAR channel identifier of the ingress connection corresponding to the ingress connection to the TSAR;

b4) deleting registration on the ingress connection from an ingress connection table;

b5) terminating the connection by providing an RSAR channel identifier of egress connection corresponding to the egress connection to the RSAR, and terminating the connection by providing a TSAR channel identifier of the egress connection corresponding to egress connection to the TSAR;

b6) deleting registration on the egress connection from the egress connection table; and

b7) gradually decreasing a number of leaves for the egress connection from the egress connection table.

22. (Original) The connection terminating method as recited in claim 21, wherein the point-to-point connection includes;

a first route connection in which the ingress connection label is different from the egress connection label; and

a second route connection in which the ingress connection label is equal to the egress connection label.

23. (Original) The connection terminating method as recited in claim 22, wherein the step c) of terminating point-to-point connection includes the steps of:

c1) reading the ingress channel handle corresponding to the ingress connection label on the ingress connection table, and deleting the registration of the ingress connection from the lookup memory by using the ingress channel handle as an address;

c2) checking if the ingress connection label is equal to the egress connection label;

c3) terminating a connection by providing an RSAR channel identifier of the ingress connection corresponding to the ingress connection label to the RSAR, and terminating the connection by providing a TSAR channel identifier of the, ingress connection corresponding to the ingress connection label to the TSAR;

c4) deleting registration on the ingress Connection from the ingress connection table;

c5) terminating the connection by providing an RSAR channel identifier of the egress connection corresponding to the egress connection label to the RSAR, and terminating the

connection by providing a TSAR channel identifier of the egress connection corresponding to the egress connection label to the TSAR; and

c6) deleting registration on egress connection from the egress connection table.

24.   (Original) The connection terminating method as recited in claim 23, wherein the ingress connection table includes information on ingress channel handles, connection parameters, ingress connection labels, RSAR channel identifiers of ingress connection, TSAR channel identifiers of ingress connection, egress channel handles, egress connection labels, RSAR channel identifiers of egress connection and TSAR channel identifiers of egress connection.

25.   (Original) The connection terminating method as recited in claim 23, wherein the egress connection table includes information on egress channel handles, connection parameters, the number of leaves, egress connection labels, RSAR channel identifiers of egress connection, TSAR channel identifiers of egress connection.

26-29. (Cancelled)